CEMVP-PM-A 13 May 2004

MEMORANDUM FOR RECORD

SUBJECT: Interagency and Public Scoping Meetings - Roseau, Minnesota Feasibility Study, Roseau River

1. On Thursday April 29, 2004 the subject open house scoping meetings were conducted in meeting room 110 of the County Government Center in Roseau, Minnesota (the interagency meeting began at 1:30pm and the public meeting portion was conducted from 5:30pm to 8:30pm that evening).

2. Thirteen persons attended the interagency meeting and included City, US Fish and Wildlife Service, Minnesota DNR, Roseau River Watershed District, and Corps officials. A sign-in roster listing the interagency meeting participants is attached as enclosure 1. And, 50 persons signed the public open house sign-in sheet (attached as enclosure 2) but there were many participants who did not sign the sign-in sheet. Participated in the public open house portion of the open house included local citizens and media representatives.

3. The focus of these open house meeting was to present information about the ongoing Corps flood control study, answer questions from interested citizen and agency representatives, and document additional problems and opportunities related to the water resources in the Roseau area. A slide show was used by the Corps to present information about the study (see enclosure 3 for display of the PowerPoint slide show) and posters and flip charts were then used to informally encourage questions and to facilitate recording of additional ideas. In addition to the slide show, handouts were provided to the meeting participants with additional information and details regarding the study planning process and anticipated plan formulation (see enclosure 4 for meeting handouts).

4. Noteworthy items coordinated and discussed during these meetings included:

   - Many citizens requested that the study find a Federal flood control solution because they had suffered enough due to past flooding and feared future flooding without a permanent project. The citizens were told that we are working closely with City, Watershed, and State officials to fully evaluate an array of alternatives that may have a Federal interest. And, as the alternatives are fully evaluations this Feasibility Study will identify the extent of Federal involvement.
   - A local citizen provided a detailed conceptual plan that recommended that we evaluate using a raised roadway dike system on the south end of town to deflect river flood waters and westerly overland drainage around and

downstream of town. This approach could provide transportation and flood reduction benefits… This will be considered more by the Project Delivery Team and the City.

- A local citizen suggested that a western aligned diversion channel is a good option if the affected landowners/farmers are fairly compensated. The western aligned diversion channel is included in the proposed array of alternatives that the study will be fully evaluating during the study.
- A number of citizens indicated general concern about the potential construction impacts to their property if a flood reduction plan were to be recommended by this Feasibility Study. The City has specifically requested that impacts to existing property owners be minimized to the greatest extent possible and the Corps designs will strive to avoid such impacts.
- There were questions about "Waffle" alternative or other upstream flood storage options. The Corps indicated that most upstream storage alternatives were of doubtful utility from a Roseau flood reduction capacity standpoint because had minor impacts on stages within the city but upstream storage could provide an added increment of protection to the City in the future...
- There was some frustration voiced by agency representatives at the lack of commitment to include environmental enhancement features in the West Interceptor proposal. It was promised by Corps staff that the project formulation would seriously look at integrating environmental enhancement features to formulate a Federal multi-purpose project. And, it appears that there are some opportunities for wetland restoration and these are being pursued.

5. These informal scoping and coordination meetings were well attended, included good dialogue and exchanges of ideas, were covered well by the media, and were meaningful for further scoping of the problems and opportunities associated with this important feasibility study.

/S/

Ed McNally
Project Manager

Enclosures 4
Sign-in roster for interagency meeting
Sign-in roster for open house meeting
PowerPoint Slide Show
Meeting Handouts

Subject: Interagency Open House Meeting – 29 April 2004, County Government Center, Roseau
RE: Roseau, Minnesota – Flood Control Feasibility Study

Sign-In Roster

	Name	Organization	Email and/or Telephone
1.	Ed McNally	Corps	651-290-5387
2.	Todd Peterson	City of Roseau	218-463-5003
3.	Chad Konickson	DNR	chad.konickson@dnr.state.mn.us
4.	Ed Fick	DNR	651-215-1994 ed.fick@dnr.state.mn.us
5.	Dick Bratty	COE	651-290-5273
6.	Laurie Fairchild	USFWS	612-725-3548 x214 laurie_fairchild@fws.gov
7.	Scott Goodfellow	COE	651-290-5635
8.	Stan Wood	MN-DNR	218-463-1130
9.	Scott Laudenslager	MN-DNR	(218)-783-6861
10.	JOHN FISHER	COE	651·290·5243
11.	KEVIN BLUHM	COE	651-290-5247
12.	Richard Larson	Roseau	218-463-1436
13.	LAVERNE Voll	Salol, MN	Roseau Watershed
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
23.			
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25.			

Encl. 1

Subject: Public Open House Meeting – 29 April 2004, County Government Center, Roseau
RE: Roseau, Minnesota – Flood Control Feasibility Study

Sign-In Roster

	Name	Organization	Email and/or Telephone
1.	David Anderson		deanderson@wiktel.com
2.	Charlene Haugen		chaugen@wiktel.com
3.	Darrin Smedsrud		
4.	[illegible]		[illegible]@hotmail.com
5.	[illegible]		
6.	(Jerry) Nancy Schultz		
7.	Allen Olson		
8.	John Wahlberg		jwahlberg@wiktel.com
9.	Verdell & Johnny Ory		vrosr@wiktel
10.	Dick Novacek		
11.	Pat Hildebrandt		hildebrandt@wiktel.com
12.	Norm Flaagan		
13.	Charles Lund	Roseau Resident	463 3511
14.	Floyd Haugen	PWT	
15.	Greg Halvorson	PWT	
16.	[illegible]	[illegible]	
17.	Dan Desjardins		
18.	Tim Erickson		463-3249
19.	Char Erickson		〃
20.	[illegible]		[illegible]
21.	[illegible]		[illegible]
22.	Galen Lisell		gjslisell@wiktel.com 424-7743
23.	Mary Ross		463-2676
24.	Jeff Pelowski		
25.	Todd Peterson		

Subject: **Public Open House Meeting – 29 April 2004, County Government Center, Roseau**
RE: **Roseau, Minnesota – Flood Control Feasibility Study**

Sign-In Roster

	Name	*Organization*	*Email and/or Telephone*
1.	Tom Grandl		
2.	Val Wenstad		
3.	Janet Lundahn		
4.	Carl Nelson		
5.	Darrell Anderson		
6.	Rob Sando		
7.	[illegible]		
8.	Harold Walker		
9.	[illegible]		
10.	[illegible]		
11.	[illegible]		
12.	Val Bernadt		
13.	Tim Lorsch		
14.	[illegible]		
15.	[illegible]		
16.	[illegible]		
17.	[illegible]		
18.	[illegible]		
19.	[illegible]		
20.	[illegible]		
21.	[illegible]		
22.	[illegible]		
23.	[illegible]		
24.	Richard Larson		
25.	[illegible]		

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Feasibility Study Underway

Roseau, Feels Like Home

As a result of the June 2002 Roseau Flood, the City and the Corps have now initiated a cost shared feasibility study that could lead to a Federal Flood Control Project for Roseau.

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Meeting Purpose

Roseau, Feels Like Home

1. To present information about flood control studies now underway that could benefit Roseau and answer your questions about these inter-related studies.
2. To obtain additional public and interagency ideas regarding problems and opportunities associated with flood damage prevention in the Roseau Area.

Q&A

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Meeting Format

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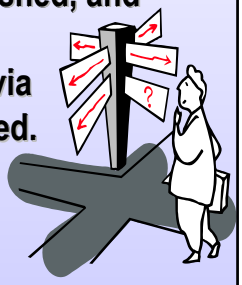
Informal Open House Format:

1st - View this overview slide show

2nd - Ask questions of the Corps, City, Watershed, and MDNR representatives present

3rd - Provide your ideas and concerns to us via flipcharts or written comment sheets provided.



NOTE: Also, please feel free to provide a comment sheet to your neighbor so they can send us their ideas…

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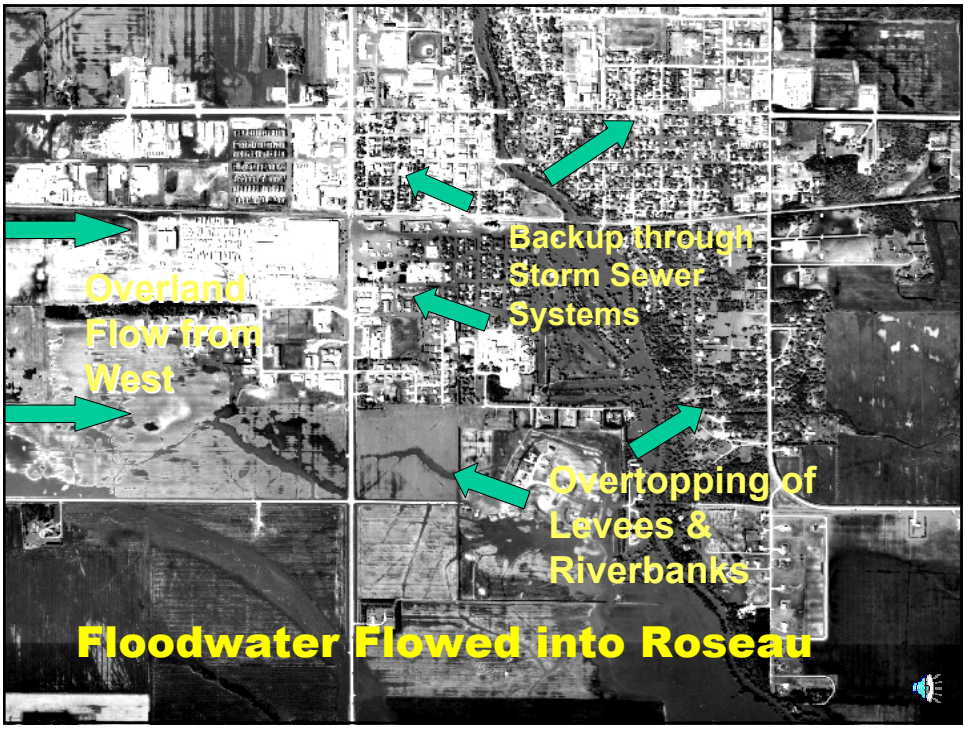
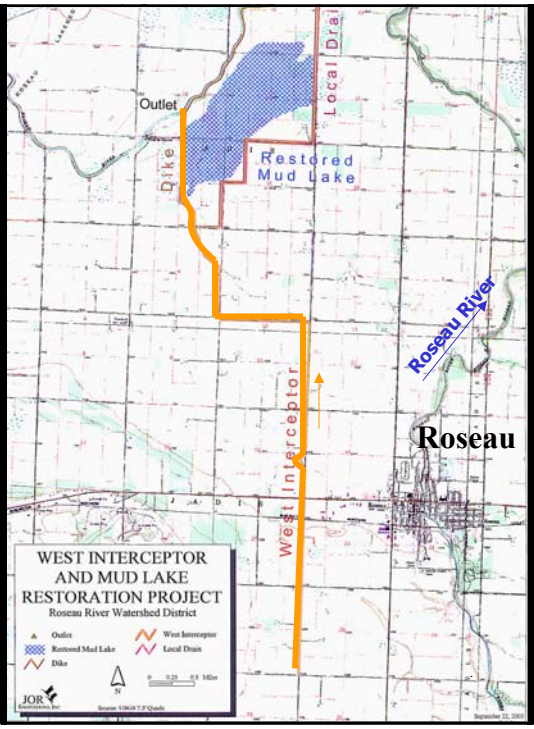
Related Flood Recovery and Flood Reduction Efforts

Roseau, Feels Like Home

This Corps of Engineers Feasibility Study focuses upon formulating a complete long-range flood reduction plan to prevent future river related flood damages.

At this time, the Watershed District and the City are also undertaking a number of separate important short-range flood reduction activities to improve local flood fighting by solving critical interior flooding problems





West Interceptor Plan and Potential Roseau River Diversion Plan

Interceptor Plan is being developed by the Roseau River Watershed District and it is also a possible alignment for a larger Flood Control Diversion Plan.

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Identified Study Objectives

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Objectives for this study have been identified through interagency coordination and negotiations. The long-range study objectives are:

To formulate an implementable permanent local flood protection project that would remove Roseau from the regulatory floodplain and would provide a solid foundation from which to fight floods larger than the project design capacity.

To integrate recreation/greenway, aesthetic, and environmental features into the project formulation plans -- thereby taking advantage of such opportunities.

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Possible Ways to Prevent Future Flooding

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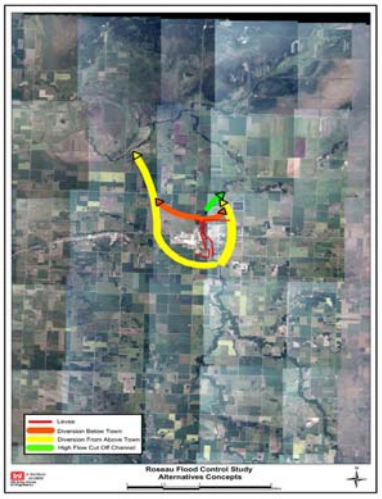

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Schedule for this Corps Project

Roseau, Feels Like Home

Key schedule dates for Corps Flood Control Actions are:

- Completed Reconnaissance level Report for Roseau in June 2003.
- Initiated this Feasibility Study in September 2003.
- Alternatives Screening Report will be completed in Sept. 2004.
- Draft Feasibility Report and Environmental Assessment will be completed and made available for your comment by Dec. 2004.
- Public Meetings on Draft Report to be held Jan. 2005.
- Final Report will be submitted for approval in May 2005.
- Construction of a Federal Flood Control project could begin in late 2006 or 2007, assuming a feasible project is formulated and a cost-sharing non-Federal Sponsor is found.

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Problems and Opportunities

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As a result of past interagency and public coordination efforts, a number of study related problems and opportunities are now known. A listing of these are available as a handout that we will soon be providing to you.

Your review, comments, and inputs on our current listing is requested. You can provide us with your comments today at the flipcharts. Or, mail us your inputs.

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Thank You !

Roseau, Feels Like Home

We appreciate your participation today and look we look forward to receiving your inputs regarding this important study.

In January, we will be returning to present you with our study findings and draft recommendations and again asking for your comments and inputs.

We look forward to working together with you and with your City and State officials to find the best ways to solve the serious flooding problems at Roseau.

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Questions and Answers

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This concludes our slide show.

We now encourage you to move to the table areas where you can get your questions answered by the Corps, City, Watershed, and MDNR officials who are here tonight.

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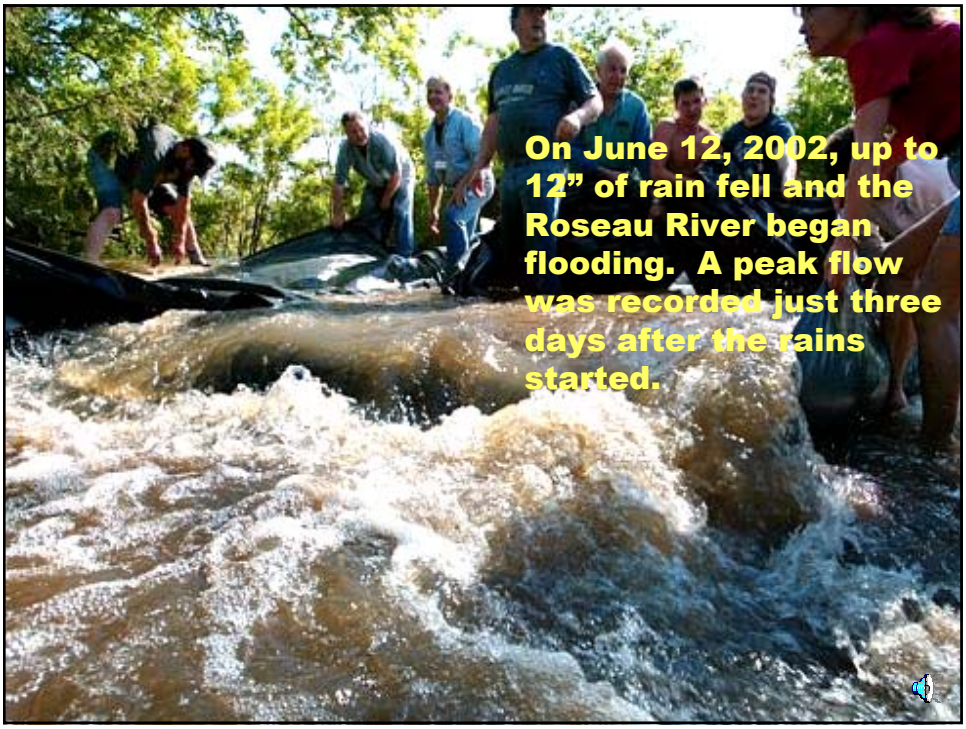
Open House Meeting

Roseau, Feels Like Home

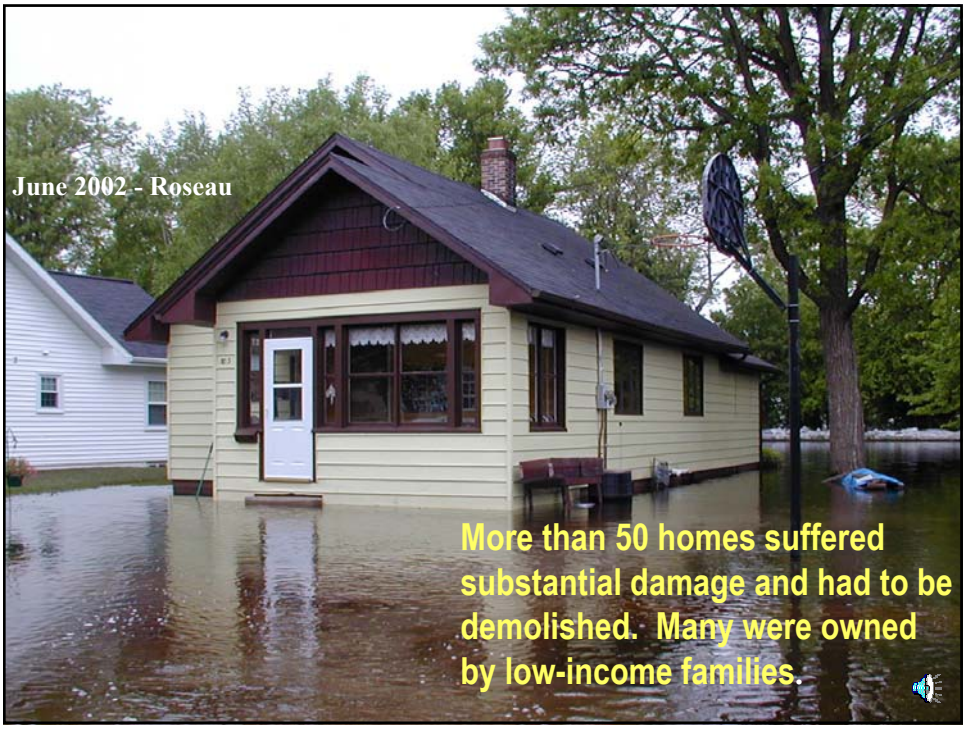
Thanks for coming

to this open house meeting

The next viewing of the slide show will begin in about 5 minutes

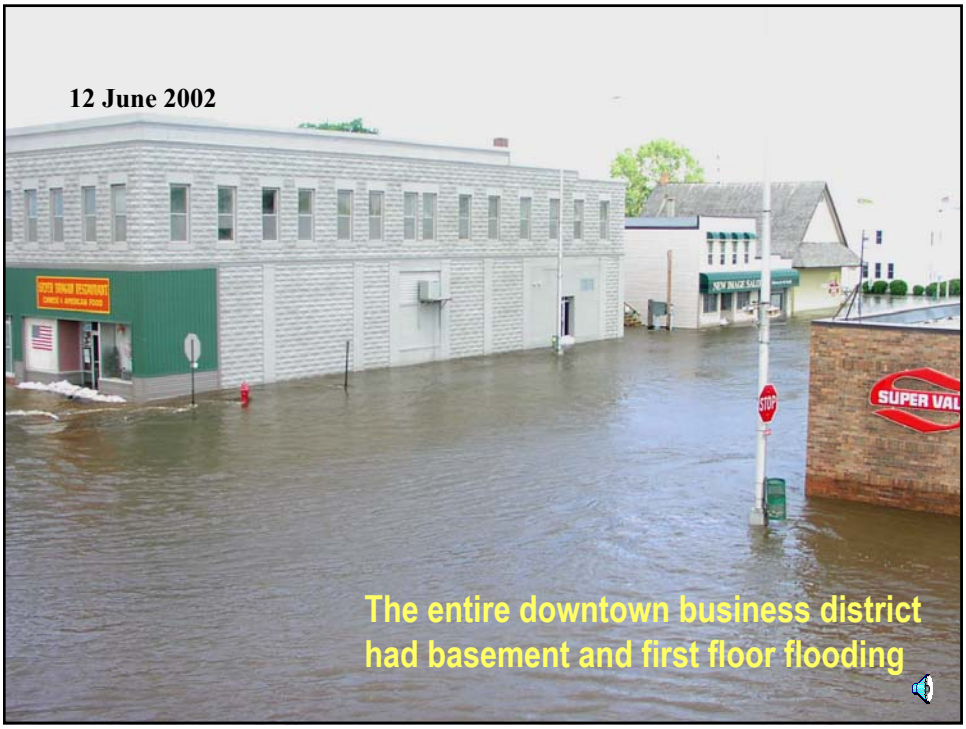

On June 12, 2002, up to 12” of rain fell and the Roseau River began flooding. A peak flow was recorded just three days after the rains started.

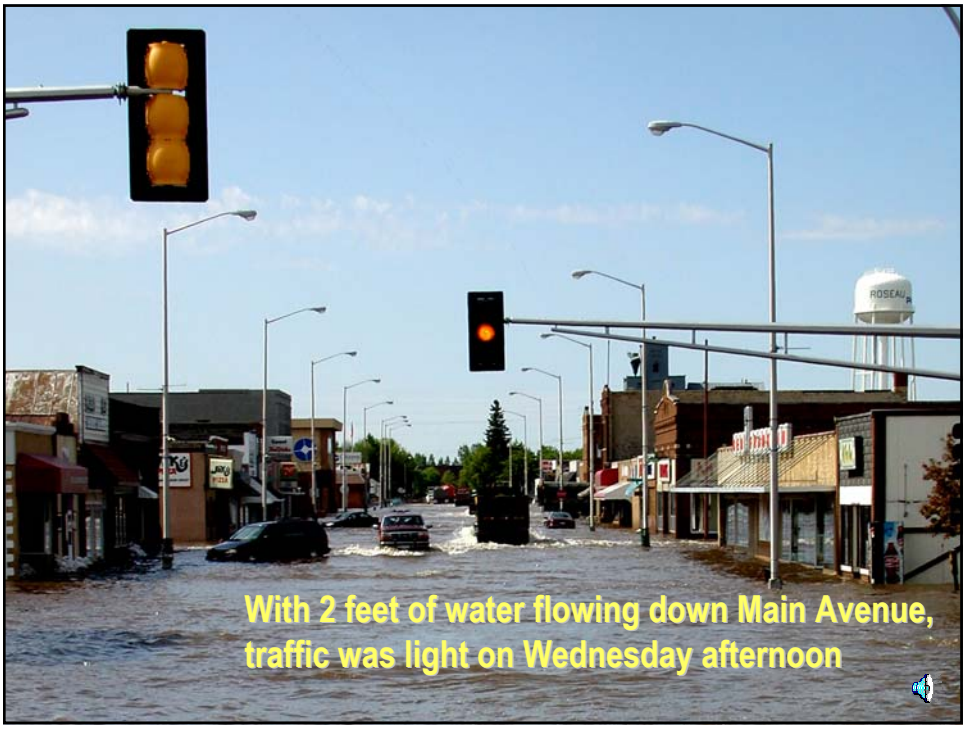

Canada
Polaris
Downtown
A flood of record devastates Roseau and the surrounding area


June 2002 - Roseau
More than 50 homes suffered substantial damage and had to be demolished. Many were owned by low-income families.

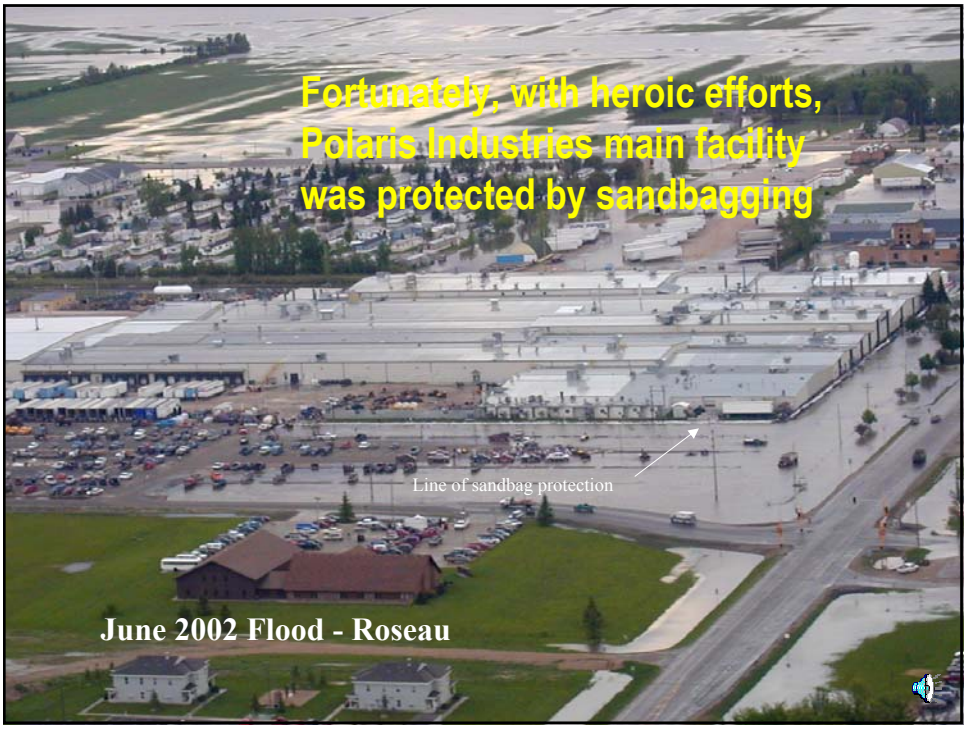

June 2002 - Roseau
Most of the homes with deepest flooding were on the east side of the Roseau River


Polaris
Downtown
It is estimated that over $120 million in damages at Roseau were caused by this flood event
Roseau River


12 June 2002
The entire downtown business district had basement and first floor flooding


With 2 feet of water flowing down Main Avenue,
traffic was light on Wednesday afternoon


Not too deep for
the Polaris ATV



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Open House Meeting

Roseau, Feels Like Home

Thanks for coming

and for your patience !

The next viewing of the slide show will begin soon

Public and Interagency Workshop

April 2004

STUDY PURPOSE

Local, State, and Federal flood management officials recognize the need to implement a permanent flood reduction project that protects the City of Roseau.

The plan formulation should take advantage of any secondary opportunities that a flood reduction project might offer (e.g., environmental restoration, recreation development, and associated greenway development in the open space area created by the buyouts associated with the 2002 flood).

To be implementable, the project must have the support of the Local Sponsor/s and a demonstrated Federal interest in implementation of the plan. In order to obtain Federal funding for a flood reduction project, the project formulation process must adhere to laws, policies, and regulations that define the planning and design process to be followed and establish specific design criteria and requirements. These criteria and requirements establish consistent standards for project designs and implementation/construction and assure that the project features will perform reliably.

A reconnaissance study and Section 905(b) Analysis for the Red River Basin was completed in 2001 to evaluate the potential for Federal interest in implementing solutions to flooding, ecosystem degradation, and other related water resource problems and opportunities in the Red River basin in Minnesota, North Dakota, and South Dakota. The Red River basin is an international basin that includes a large portion of southern Manitoba. Federal interest demonstrated for that basinwide study resulted in development of a number of Project Management Plans (PMPs) and negotiation of a number Feasibility Cost Sharing Agreements (FCSAs) with non-Federal partners for the next phase of study. The Roseau River Subbasin was a part of the approved 905(b) Analysis for the Red River Basin. However, a more detailed and specific PMP and 905(b) Analysis for the Roseau River Subbasin was not provided at the time of submittal of that report.

In March 2003, an initial Corps milestone report was prepared using Section 205 funding to determine the likelihood of a Federal project and the likelihood of a Local Sponsor. This CAP milestone report focused on the magnitude of flood damages that could be prevented by a flood control project at Roseau. On the basis of that analysis and internal coordination, the Corps Mississippi Valley Division Office determined that further cost-shared Feasibility Studies for Roseau are warranted.

PLAN FORMULATION

Early in the plan formulation, the project delivery team coordinated with local officials and stakeholders and reviewed pertinent references to document existing and assumed future without project conditions. A summary of localized existing conditions and future without project condition for the immediate Roseau area follows in this section of the briefing materials. NOTE - Public and Interagency inputs will be sought at meetings in late April 2004.

Existing Conditions

The population of Roseau County is 16,038, with approximately 50 percent of the population living within a 10-mile radius of the City of Roseau. The county seat for Roseau County, the City of Roseau has a population of approximately 2,800 residents, and the population is growing. Roseau is an important center of manufacturing and serves as a strong retail trade center for the region, due largely to the presence of the Polaris Industries plant within the city. Roseau is also the largest city within Roseau County with a market area of over 60 miles. This market area encompasses all of Roseau County, Lake of the Woods County, and portions of Marshall, Kittson, Pennington, and Beltrami Counties and southeastern Manitoba, Canada. The Roseau area currently has a significant housing shortage, and the City has cited this as a major constraint in the growth of industry in the area.

Roseau is subject to major flood events. The catastrophic flooding at Roseau in 2002 resulted in over $120 million in flood related losses, and the existing emergency levee system that failed during that flood is known to be inadequate and unreliable. Therefore, Roseau continues to rely on flood insurance and emergency flood fights to help offset the flood risk.

Based on preliminary reconnaissance evaluations, the average flood damages for the Roseau area are estimated to range between $1.2 million and $2 million annually. This magnitude of localized flood damages at Roseau is significant.

Roseau has constructed a temporary levee system for flood fighting. These levees run along the east and west banks of the Roseau River through a large portion of the town. The levees were inspected in 1996 and 2002 for inclusion in the Non-Federal Flood Control Works Rehabilitation and Inspection Program (RIP) offered to communities by the Corps of Engineers. The levees were given unsatisfactory ratings for both inspections, and thus were rejected for participation in the RIP. Roseau currently owns and operates recreation amenities including five city parks, a public golf course, and extensive facilities to support major high school and youth hockey programs. However, interconnected trail facilities and/or riverfront open space parks are not currently attractions of the area. The habitat conditions present along the banks of the Roseau River as it passes through the community of Roseau are limited. The majority of the area is residential and parkland with some commercial development. Because of the high level of human activity, the faunal assemblage is limited. The agricultural areas near town are typical of the area – a mixture of row crops and pasture interspersed with previously farmed areas that have been abandoned and are reverting to more natural conditions. Note: Roseau currently belongs to the National Flood Insurance Program administered by FEMA.

Expected Future Conditions

The presence of landslides resulting from weak foundation soils and the proximity of the levees to the river channel, unwanted vegetative growth (large trees growing on levee slopes), and encroachments in the existing temporary levee system undermine the viability of these features. In addition to these deficiencies, the lack of information concerning levee materials and construction methods provides further uncertainty on the future reliability of the existing levees. Based on the deficiencies found during previous inspections, uncertainties with levee material and construction methods, and engineering judgment, the no-action future without project condition alternative should not credit the existing levees when computing damages. Therefore, localized flooding at concentrated damage areas will continue to occur, and emergency service costs will increase as citizens attempt to combat impending spring floods. Urban areas such as Roseau will have a continued need to provide emergency response. It is also likely that, at some point in the without project scenario, catastrophic flood damages will occur in the City of Roseau (similar to the 2002 Roseau River flood). When that future large flood event occurs, there is a potential for loss of life and a high probability of many structures being significantly damaged and removed as part of post-flood Federal Emergency Management Agency (FEMA) and State buyouts. This scenario would be a local nightmare that could devastate the community (e.g., flood recovery costs would be very high, impacts to infrastructure and the downtown business district would affect services, the loss of tax base would make recovery problematic, and available local housing would be adversely affected - especially since there is such a housing shortage in the Roseau area).

Localized flooding at concentrated damage areas will continue to occur, and emergency service costs will increase as citizens attempt to combat impending spring floods. Roseau will have a continued need to provide emergency response. Photograph 1 shows a view of the 2002 flood at Roseau – history is likely to repeat without a permanent project.

The future without condition assumes the following (Consistent with Corpswide guidance contained in ER1105-2-100):

The City of Roseau will continue to belong to the National Flood Insurance Program and accordingly will preclude new development in the regulatory floodway, and will require new development outside the floodway but within the 100-year floodplain, be constructed with first floor elevations at or above the median discharge 1% chance flood level. Based on this future development constraining scenario and constraints associated with the Flood Plain Management Executive Order 11988, future flood damages will remain the same as the existing condition -- with no increased development or intensification of use/damageable structures in the study area. According, based on preliminary reconnaissance evaluations, the average flood damages for the Roseau area are estimated to range between $1.2 million and $2 million annually will continue into the future (Note: the annual flood damages expected will be refined in the feasibility study).

The existing temporary/emergency levee system has been evaluated to determine if it is reliable to any level and should be assumed to provide any level of protection. This credit-to-existing levees has determined that the presence of landslides, unwanted large tree growth on levee slopes, encroachments and the lack of information concerning levee materials and construction methods provides significant uncertainty on the future reliability of the existing levees. It is also noteworthy to mention that this levee system recently failed in numerous locations during the 2002 flood. Based

on these known deficiencies and uncertainties associated with levee material and construction methods it is assumed that the no-action alternative should not credit the existing levees when computing damages.

The City and the Roseau River Watershed District have a couple of significant internal drainage projects that are currently in the plans and specifications stage of design that are very likely to be completed within the next five years. These projects include:

A west intercept ditch, which will be located on the west side of Roseau and will intercept overland interior stormwater and divert stormwater drainage flows into the Roseau River downstream of Roseau. This will help to solve some of Roseau's interior flood control problems but will not address the flooding risks originating from Roseau River flooding.

Some plans to construct new interior flood control ponds and/or pumping stations are also being prepared by the City and the City is coordinating the design of these IFC features to meet Corps standards. The likelihood of these improvements being funded and constructed is uncertain but appears likely within the next 5 years. Therefore, these IFC features are assumed to be part of the future without project conditions and are being coordinated extensively. It is important to note that these new IFC features will address only interior flood damages associated with non-river flooding. Therefore, the direct river related flood damages will remain the same as the existing condition river induced flooding.

A number of relatively small segments of new emergency levee are being designed now and will be constructed to replace sections of the emergency levee that failed during the 2002 flood – primarily as a short-term fix of the temporary levee system. These segments are being designed by the City to meet Federal design standards that would allow them to tie into a Federal permanent levee system – if such a permanent levee system should be a reality later. These new local levee segments will provide reliable levees for short reaches and are intended to enhance the local flood fighting capability. However, these new levee segments would still be tying into an unreliable existing temporary levee system and these short reaches of "good levee" will not substantially affect the high risk of failure of the local levee system.

Identified Objectives, Problems, and Opportunities

The water resource related problems and opportunities associated with the larger context basin-wide and sub-basin area were presented in the August 2003 Section 905(b) Analysis for the Roseau River Subbasin (see that report for detailed basin wide and subbasin perspectives of problems and opportunities). Efforts by the project delivery team were made to collect and generally summarize basin-wide problems and opportunities (i.e., these originated from reconnaissance phase coordination with stakeholder and interagency coordination). They follow in tabular form below.

Table - Identified Basin, Subbasin, and Local Problems and Opportunities

Basin-wide:

Location	Problem	Opportunity
Red River Basin	Flooding, streambank erosion, water supply, water quality, aquatic and riparian habitat degradation, and recreation needs	Need for basin-wide water resources management plan to address the following issues: water quantity (flooding, timing and stormwater management); water quality (point and non-point source pollution); recreation needs (greenways); growth-related impacts on water resources. Potential outputs would include both local and regional project specific recommendations (structural and nonstructural) to guide formulation of local projects within a basin-wide context, as well as nonstructural recommendations (e.g., land use controls) that would be administered locally. Would also include a basin-wide GIS system.

Subbasin:

Location	Problem	Opportunity
Roseau River Subbasin	Flooding, erosion, channel instability, water quality, aquatic/riparian habitat degradation, and recreation needs	Flood damage reduction via upper and mid-basin floodwater retention; channel stabilization, erosion reduction and aquatic/riparian habitat restoration via reestablishment of a sinuous stream form, water quality improvement via Best Management Practices and reduced erosion.

Local:

Location	Problem	Opportunity
City of Roseau	Localized flooding potentials that are made worse by in-town channel constrictions at existing bridges, lack of recreation/open space and aesthetic amenities along the river, encroachment of development into the floodplain, and structures hugging the riverbanks, channel and emergency levees instability	The 2002 flood has been a rallying event for all levels of government to find and implement a permanent flood protection project at Roseau. There is potential that a permanent flood protection project would provide a high enough level of protection to allow removal of a large number of structures from the regulatory floodplain. There is also potential to make a permanent project a multi-purpose project with potential greenway development that could result in open space/recreation and aesthetic and environmental benefits. These opportunities would be explored as part of a feasibility study.

Then, additional more specific coordination efforts with the Roseau River Flood Mitigation Task Force and discussions with City officials, State and watershed reps, county officials, and the Corps Project Delivery Team have resulted in the identification of specific localized objectives,

concerns/problems, and opportunities for incorporation into the Roseau project formulations. These are listed below.

PRIMARY PROBLEM – On 9-11 June 2002, intense rain fell over the Roseau River basin, dumping an extraordinary amount of water into the study area (as much as 11 inches of rain fell in some locations). This water quickly collected and drained into the Roseau River, overflowing the City of Roseau's emergency levee system and flooding most of the area. All the structures in town with the exception of the high school and several manufacturing buildings were flooded. The flood damage was enormous, with significant damage to downtown businesses and private residences, and city services were affected significantly for months (an estimated $50 million of damages to city public and hospital buildings, streets, and public utilities occurred to Roseau during this flood. More than 50 homes, many owned by low-income families, were demolished as a result of the flood. The Roseau County Museum, Interpretive Center, City Hall, and Library also needed to be demolished. This major flood lasted for several weeks, with heavy impacts to over 80 percent of the town. Total damages for this single event have been estimated at over $120 million and resulted in major hardships to the entire city. Recovery is still ongoing (see photo below for view of the Roseau 2002 flood).

OBJECTIVE – The primary objective of this study is to define an implementable permanent flood protection project that will significantly reduce the long-term risk of catastrophic flood damages to Roseau, Minnesota. This project needs to be technically feasible from an engineering and economic perspective.

Photograph - The June 2002 Roseau River flood caused devastation to Roseau.

OBJECTIVE – Another important objective is that a project not cause induced damages to areas upstream or downstream of the study area and that the "opposite side of the river" from any proposed project features is minimized. In response to this objective, hydraulic project design criteria will be established to avoid flood reduction actions that would cause induced stage impacts upstream or downstream.

CONCERN – After the temporary levee systems at Roseau were overtopped during the 2002 flood, there was growing local concern about reliance upon levee systems for permanent protection. There was also strong local support for alternative solutions that would minimize further social impacts (e.g., locals fear that setback permanent levees would significantly impact the community and would also make the existing housing shortage more acute). As a result of these concerns, the Corps will be analyzing several possible diversion plans that would reduce or eliminate levees in town.

CONCERN – During the 2002 flood, there was considerable stage increase associated with the existing in-town railroad bridge. As a result, there is local desire to remove or enlarge the embankment opening at that bridge to help reduce flood stages in town. An evaluation of this problem will be done as part of the feasibility study.

CONCERN – Citizens and city officials are concerned about the probable negative spiral effect that another major flood or floods would have on the community. Specifically, if a major flood breached the existing temporary levee system, many structures would be damaged to the point where they would need to be condemned and removed. Another traumatic flood event with damages at Roseau would be difficult to overcome. From social and economic perspectives, the concern is that these flood-induced actions would significantly decrease available housing, decrease community and neighborhood cohesion, adversely affect local property value and the tax base, and likely result in a decline in the community population. It could also have adverse affects upon regionally significant business – especially the Polaris plant located within Roseau.

CONCERN – From an engineering perspective, the major geotechnical constraint is the potential for poor riverbank and levee foundation stability. The instability is caused by a combination of the geologic and geomorphologic conditions in the area. A typical location where stability is of greatest concern is on the outside of a meander in the river, where erosional forces are highest. The erosional nature of the river, combined with the weak lacustrine soils deposited in the geologic past, contributes to the riverbank and levee foundation stability problems throughout the study area. Levees located near or on the outside of meanders will most likely need to be set back several hundred feet from the riverbank, resulting in removal of houses and other related structures. Floodwalls and mechanically stabilized earthen wall designs have already been used in numerous locations along the project alignments presented in this report in the ongoing efforts to avoid impacts to structures and critical infrastructure such as roads and utilities. Additional potential techniques to move the levees/floodwalls riverward to protect additional existing structures are being analyzed but are not available for this report. When those detailed evaluations are complete, they will be used to refine the project alignments where possible -- from economic, engineering, and environmental perspectives. These detailed evaluations will require additional field data collection and analysis that is now under way

CONCERN – An environmental issue that could affect project design is the potential presence of hazardous, toxic, or radioactive waste (HTRW) materials. To assess the study area for potential HTRW materials, and for other contaminated materials that may not meet the strict definition of HTRW materials (as defined in ER 1165-2-132), an Environmental Site History will be completed and Phase I Environmental Site Assessments (ESAs) and Phase I field investigations will be completed for the study area.

OPPORTUNITY – The City has recently conducted public and design team workshops to look at future community recreation and environmental quality measures. As a result of these discussions, the city has now asked that recreation, ecosystem restoration, and aesthetic features be evaluated and integrated into the feasibility flood reduction plan formulations. Such opportunities will be identified and integrated where possible.

CONCERN – Construction of a flood control project could affect historically/culturally significant structures located on the current project alignment. The extent of the impacts is not yet fully defined; the planning and design phases will evaluate such effects and seek to avoid or minimize any damages to such structures.

CONCERN – Three Federally designated threatened species are listed for Roseau County. These species and their critical habitat needs will have to be carefully considered in the alternative selection and design phases in order to minimize impacts.

OPPORTUNITY – Water resource studies conducted by Federal, watershed, State, and local levels of government have identified flooding of Roseau as a critical problem in the Red River basin. Accordingly, Minnesota has taken steps to assist floodprone cities, including Roseau, in funding Federal flood control studies and in preparing detailed design reports and plans and specifications. The State has also indicated a willingness to assist in the construction of project features to substantially reduce the cities' financial costs. The combined financial resources of identified non-Federal and Federal sponsors make a significant permanent flood reduction project possible. As a result, the City of Roseau has signed the FCSA and expressed a willingness and capability to serve as the non-Federal sponsor.

OPPORTUNITY – Because the study area is located in a portion of the Roseau River Subbasin that is located within Minnesota and does not share geographic boundaries other States or Canada, the complexity of the coordination with stakeholders is comparatively lessened – compared to border scenarios.

OPPORTUNITY – Substantial areas in Roseau area were severely affected by the flood of 2002. Much of this area has already been purchased from the landowners. This is clearly a traumatic experience for the people directly affected by the flood and buyouts. These buyouts, however, provided public open space near the river that offers new opportunities for setback levees, greenway development, and reclaimed environmental habitat.

OPPORTUNITY – Historically/culturally significant structures could be protected from high risk of flooding as a result of implementing a major permanent project. This would provide an opportunity to protect those structures from future floods.

OPPORTUNITY – The portion of the Roseau River between the town of Roseau and the Canadian border has been significantly degraded. Where possible, natural design principles should be used to restore more natural, pre-development conditions.

OPPORTUNITY – Loss of base flow in the river has been one of the significant factors in the degrading of the river. Activities such as restoring upstream wetlands and development of off channel water storage areas to attenuate peak flows and stabilize hydraulic conditions as well as protecting existing areas that accomplish these goals should be pursued.

OPPORTUNITY – Appropriate culvert design and size should be used that permit fish passage during spring high water periods.

OPPORTUNITY – Establish or improve the riparian corridors along waterways (including ditches); encourage the use of native vegetation.

OPPORTUNITY – Where the river channel has been substantially enlarged for flood control purposes, a more natural stream channel configuration for low and average flow conditions should be established.

Additional problem identification activities will be conducted in late April 2004 when interagency and public meetings will be held to seek additional inputs to complete a more comprehensive inventory of water resource problems and needs.

Initial Array of Alternatives/Features

In order to effectively formulate a feasible flood reduction project and assess the effects of the project, a full array of potential flood protection strategies and associated specific plans must be considered. Plan comparison evaluations are done initially at a low level of detail, usually in a reconnaissance study and in the early screening phases of the feasibility study phase. These initial study efforts focus on determining if there is a potentially feasible plan that is in the Federal and local interest to pursue. If Federal and local interest is found, then studies of a greater level of detail are completed in feasibility and/or reevaluation studies. Flood protection plans found to be economically, environmentally, and socially feasible are evaluated further in a progressive screening process until a single National Economic Development (NED) plan can be defined and documented. This NED plan is the plan that has the greatest net benefits and is the plan that the Federal Government is most supportive of constructing. One exception to this process is when the non-Federal Sponsors identify a Locally Preferred Plan (LPP). A locally preferred plan is a plan that is economically feasible plan that is selected by the Local Sponsor and, if it is more expensive than the NED plan, may required a higher local cost sharing requirement to implement.
Public and interagency involvement, scoping, and product reviews are sought throughout the process in order to keep the public informed and to receive and incorporate their ideas and concerns.

The results of past flood reduction studies conducted on the Red River and more specifically in the Roseau River watershed were researched for possible application, and many possible flood

reduction strategies were considered for implementation at Roseau. Specific flood reduction strategies that were identified and are being considered follow:

A "No Action" Plan (and associated future without project conditions).

Nonstructural measures such as floodproofing to minimize flood damages, and relocation/evacuation of homes to place flood prone structures outside the floodplain. Nonstructural alternatives evaluated would include elevating houses and other structures along the Roseau River. It may be difficult in certain river reaches to construct a levee without removing a large number of houses. This is because the flat slopes of the levee prism will extend too far inland and require taking the houses. It is thought that many of these houses would only have to be elevated a few feet to keep the first floor elevations above the one percent flood. In certain areas, it may be possible to construct levees (road raises) under the residential roadways parallel to the river, and elevating the houses left to the riverside of the levee.

Varieties of downstream channel cutoff and in-town channel modification plans to deepen, widen, or straighten the river and thereby reduce flood stages. High flow cut-off channels are being considered across two meanders downstream of Roseau. This could add some stage reduction in Roseau if there is sufficient head loss along this meander reach.

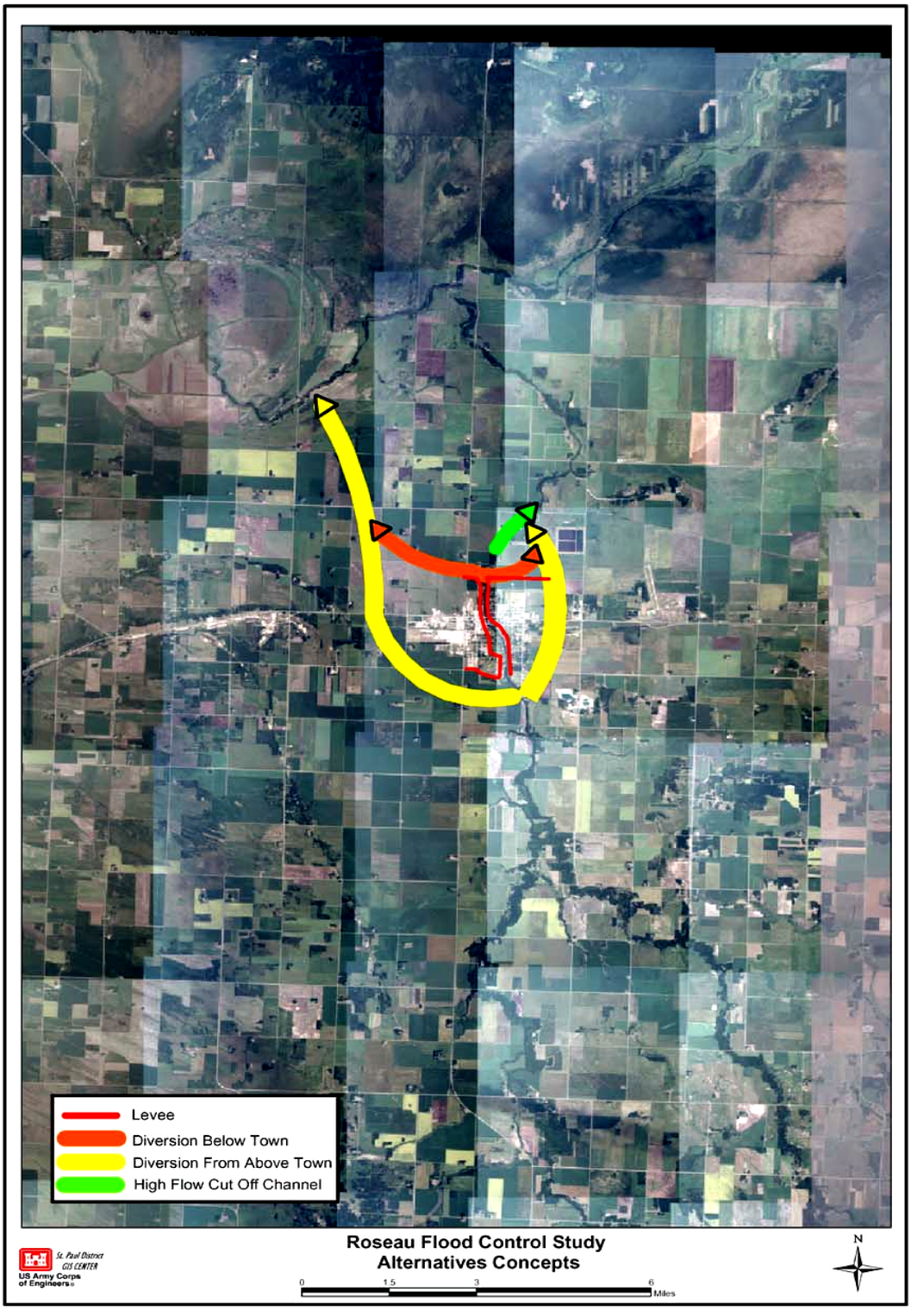
Bridge modifications (enlarging the embankment opening, raising, and removal) in the study area to reduce flood stages.

A variety of diversion channel plans on both sides of the Roseau River to carry floodwaters around the urban area. Diversion alternatives are being considered both upstream and downstream of town and on both sides of the Roseau River. Upstream diversion alternatives would divert water around either the east or west side of town. These alternatives would reduce flood stages in Roseau by reducing the slope of the water surface through the reach of reduced discharge. Basin-wide flood reduction measures such as upstream storage projects that would catch and hold floodwaters long enough to prevent flooding downstream at Roseau.

Permanent levee/floodwall plans that would be setback from the river where practical to improve hydraulic efficiency, create open "greenway" spaces, and provide cost effective flood reduction. The height of the levee systems would be a design variable in the plan formulations that would compare differing levels-of-protection in the study area.

Combinations of the above flood reduction features to most cost effectively solve flooding problems at Roseau (combination plans could involve integration of permanent levee, channel, and non-structural features and/or secondary purpose features including recreation/aesthetics and ecosystem restoration features).

A graphic showing the various alternative plans being considered in this feasibility study is follows:


Levee
Diversion Below Town
Diversion From Above Town
High Flow Cut Off Channel
St. Paul District GIS CENTER
US Army Corps of Engineers
Roseau Flood Control Study
Alternatives Concepts
0
1.5
3
6
Miles
N